CHAPTER 4 - ENVIRONMENTAL CONSEQUENCES

This chapter evaluates three alternatives on the basis of environmental consequences or impacts relative to the issues identified in Chapter 1. The chapter is organized by issue.

*****CHAPTER HIGHLIGHTS*****

- General Impact Analysis
- A Description of Impacts associated with Service Trust Resources
- A Description of Impacts associated with Visitor Services
- A Description of Impacts associated with Habitat Management
- A Description of Impacts associated with the Yellow River Focus Area
- A Summary Table of Environmental Impacts

1. GENERAL IMPACT ANALYSIS

1.1 Unavoidable Adverse Impacts

Under Alternative 1 and Alternative 3, the potential development of access roads, dikes, control structures, visitor parking areas, and reclamation of former building sites could lead to local and short-term negative impacts to plants, soil, and some wildlife species. Greater public use of the Refuge may result in increased littering, noise, and vehicle traffic.

1.2 Short-Term Use Versus Long-Term Productivity

The local, short-term uses of the environment under Alternatives 1 and Alternative 3 include habitat restoration and enhancement activities for the benefit of Service trust resources. Alternatives 1 and 3 could also include the development of additional public use facilities to further the public's understanding and appreciation of the natural world. The resulting long-term effect of these alternatives includes increased protection of threatened and endangered species, increased waterfowl and songbird production, and long-term recovery of a myriad of species dependent on quality wetland and grassland habitats. In addition, local and regional people will gain long-term opportunities for wildlife-dependent recreation and education.

1.3 Irreversible and Irretrievable Commitments of Resources

Funding and personnel commitments by the Service or other organizations under Alternatives 1 and 3 would be unavailable for other programs. Fee-title acquisition of lands by the Service would make them "public lands" and preclude other use of these lands in accordance with individual desires. Traditional land uses may change since uses on Service lands must be shown to be compatible with the purposes for which the land is acquired. Any lands purchased will lose their potential for future development by the private sector as long as they remain in public ownership. Structural improvements that are purchased with any land may be declared surplus to government needs and sold and/or demolished on site. Land that a new visitor center would be built on would no longer be available for hunting purposes or provide habitat for wildlife and plants.

1.4 Cumulative Effects

Cumulative effects (or impacts) are those effects on the environment resulting from incremental consequences of the alternatives when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these actions. However, accurately summarizing cumulative effects is difficult in that while one action increases or improves a resource in an area, other unrelated actions may decrease or degrade that resource in another area.

Over many years the cumulative effects of wetland drainage, conversion of native prairies into crop land, and the clearing of bottomland forests and savannas have been severe on listed species, waterfowl and other migratory birds, and native biological diversity, both at the local, state, and national levels.

The State of Wisconsin has lost over 53 percent of its original wetlands and 99 percent of its original prairies and oak savannas. Prior to European settlement, Wisconsin is estimated to have had approximately 10 million acres of wetlands and 4 million acres of savannas. Today less than 5 million acres of wetlands remain. Savannas have been reduced to less that 60,000 acres statewide. At the National level, of the estimated 221 million acres of wetland habitat present in the lower 48 states at the time of colonial America, only 103 million acres remain (47 percent). Draining, dredging, filling, leveling, and flooding have reduced wetlands to where now twenty-two states have lost 50 percent or more of their original wetlands, and ten states have lost 70 percent or more (Dahl, 1990). The consequences of this intensive conversion of wetlands, prairies, and oak savannas have been significant declines in migratory birds populations, water quality degradation in lakes, rivers, and the Gulf of Mexico, and probable increased flood frequency and intensity along mainstem rivers and their major tributaries.

The wide-scale loss of oak savanna and pine barren ecosystems across twelve states and the province of Ontario, Canada, has had a severe negative impact on the Karner blue butterfly. Over the past century, the number of Karner blue butterflies (KBB) has declined by at least 99 percent. Over 90 percent of that decline has occurred in the last 15 years. Loss of habitat resulted in a rapid decline in Karner population numbers, and extirpation of large populations across its range. Today scattered populations are only found in portions of New Hampshire, New York, Michigan, Wisconsin, Indiana, and Minnesota. As a result, the KBB was proposed for federal listing on January 21, 1992, and listed as endangered on December 14, 1992. Presently the Refuge is home to the world's largest remaining population of the Federally listed Karner blue butterfly, supporting 12 population complexes.

The long-term declines in early successional forests across the north-eastern and north-central United State has contributed to the decline of many bird species as well. Selective harvesting, fire suppression, urban sprawl, and cessation of agricultural abandonment contributed to the present imbalance in distribution of young forests (Oliver and Larson, 1999).

The continent's only migratory population of whooping cranes winters at Aransas National Wildlife Refuge on the Texas Gulf Coast and is vulnerable to a catastrophic event such as a major hurricane. In the summer of 2001, a population was introduced on the Refuge as part of an effort to establish a migratory population in the eastern U.S. and to contribute toward recovery of the species.

The original tallgrass prairie, which extended from western Indiana to the eastern part of Kansas, Nebraska, and North and South Dakota and south to Oklahoma and Texas, has been virtually eliminated throughout its historic range. Recent surveys suggest that 82.6 to 99.9 percent declines in the acreage of tallgrass prairie have occurred in twelve states and one Canadian province since European settlement. Loss and fragmentation of prairie landscapes combined with changes in natural processes (e.g., fire suppression) have had negative consequences for many grassland plants and associated animals

For years following the initial conversion of native Midwestern prairies, many prairie-dependent wildlife species remained relatively stable through their ability to colonize agricultural grasslands. However, 20th century agricultural grassland loss has followed a similar path of decline as native prairie loss in the 19th century. In many parts of the Midwest, agricultural grassland are at their lowest level in more than 100 years

Consequently, grassland-dependent birds have shown steeper, more consistent, and geographically more widespread declines (25-65%) than any other group of North American birds (Samson and Knopf 1994). Other grassland associated mammals, insects, and microorganisms are threatened with a similar fate. Currently there are 55 grassland species in the U.S. considered threatened or endangered (Samson and Knopf 1994). Species experiencing serious declines that utilize the Refuge include the bobolink, Henslow's sparrow, grasshopper sparrow, vesper sparrow, savannah sparrow, lark sparrow, field sparrow, dickcissel, eastern meadowlark, and American bittern (National Biological Survey 1995). The grasshopper sparrow and dickcissel have declined over 80 percent in Wisconsin since the mid-1960's.

Alternatives 1 and 3 could reverse many of the above mentioned population declines (at least locally) for many bird species and Karner blue butterflies by restoring and managing additional savanna habitat. The Refuge will be restoring approximately 3,000 additional acres of savanna habitat, which will bring its total savanna habitat to approximately 3,500 acres. The 3,500 acres will be distributed between 35 sub-sites that are distributed over approximately 15 square miles. Through these efforts the Refuge aims to insure a minimum Karner population of 6,000 to 7,000 second flight adults and will constitute a major step toward the recovery of that species. Restoration and preservation of additional savanna on the Refuge would also help reverse the long-term decline in early successional forests across the region.

Alternative 3 would also result in the restoration and management of an additional 3,500 acres of grasslands on the Refuge for nesting waterfowl and other migratory birds, thus contributing to the recovery of many grassland-dependent species of regional concern. Alternative 2 would allow past trends to continue; and conditions at the local level for KBBs, savanna and grassland-dependent birds, and native biological diversity would worsen.

All of the alternatives described in this EA would contribute to the recovery of bald eagle, whooping crane, and gray wolf. Efforts to establish a migratory population of whooping cranes on or near the Refuge would not only restore the whooping crane to part of its historic range, but also provide a geographically distinct migratory population, leading toward the long-term recovery of that species.

All of the alternatives described in Chapter 2 offer opportunities for additional actions relating to the protection, restoration, and management of habitat for the benefit of Service trust resources

independent of Service operations. These other actions, if initiated by other Federal agencies, the state, local communities, non-governmental organizations or private individuals, could be coordinated with the Service through cooperative agreements, mutual aid agreements, matching challenge grants, etc. or through technical assistance between cooperators. Typical cumulative actions that could be taken by these other entities include the acquisition of land in fee title, acquisition of conservation easements or access rights-of-way, protection of water quality, cleanup of contaminants, implementation of various agricultural management practices and techniques, management of private lands for wildlife and timber stand improvement through county and state programs, protection of endangered species through the Endangered Species Act and state laws and regulations, management of resource uses by the states and non-governmental organizations, management of non-game species by the state, predator and damage control by USDA's Animal and Plant Health Inspection Service and the state, implementation of grants through the Endangered Species Act, Federal Clean Water Act, Federal Reclamation Act and to the state through the Federal Aid in Fish and Wildlife Restoration Program and to private landowners through the Service's Partners for Wildlife program, to name a few. These cooperative actions are all possible, and the chances for initiating any of these cooperative actions by others may increase by the mere presence of the Refuge and Refuge staff in the area.
In the final analysis, the integrity of the natural resource values encompassed within the state and country (all inclusive) will depend on actions taken by others. Refuge land, even with the acquisition of additional land in the Yellow River Focus Area, would exist only as a small portion of the total acreage within the state and nation.

Cumulative effects on property taxes paid to the local taxing bodies (townships, county, school districts) by the Service and others would likely be neutral, since the taxing bodies have discretion in adjusting their revenue stream in order to account for their expenses. While the Service does not pay taxes, it does make an annual refuge revenue sharing payment (see Chapter 2 “Elements Common to all Alternatives”) to the townships where Service-owned land is present. Since these payments are based on land value, an acre of land valued at $1,000.00 would generate a $7.50 payment each year, or $7,500.00 per million of land value (at full entitlement). In Juneau County, refuge revenue sharing payments at full entitlement are roughly 32 percent of what taxes would be if lands had remained in private ownership (based on personnel communication with Juneau County, Wisconsin)(see alternative 3 below for additional analysis/clarification of refuge revenue sharing payments).

Further, the presence of a national wildlife refuge is often considered an asset to an area contributing to the quality of life. Not only does it offer public recreation potential and greatly enhance the educational opportunities of the local schools, it serves as an attraction for people looking to relocate from urban areas. Therefore it can be expected that as more people relocate to the two counties (due in part to the presence of the Refuge), taxable real estate such as new homes, cabins, and other land improvements will increase, thereby increasing the local private property tax base.

As natural habitats in the area are destroyed and fragmented into smaller parcels by new development activities, acquisition and management of land in the Yellow River Focus Area will represent a compensating factor to make up for the loss. Long-term environmental benefits would be gained from habitat protection and enhancement resulting from Service activities in this area. Biodiversity, including numbers and variety of non-game species, would be enhanced. Threatened and endangered species would benefit from specific management actions and monitoring programs. As more of the area becomes protected and managed, the more important

and recognized it will become for natural resource values and as a special place for people to find enjoyment and educational benefits.

The trend in demand for wildlife-dependent recreation (e.g., wildlife observation) is expected to continue into the foreseeable future, due in part to the increasing population of retirement-age Americans. As the number of visitors to the Refuge area increases, private enterprises would be likely to develop support facilities and services such as campgrounds, motels, restaurants, sporting goods stores, etc. to meet the increased demand. Increased visits to the Refuge could result in additional on-site facilities such as a visitor center, parking areas, trails, observation towers, etc. These new facilities both on and off site could reduce available habitat and create localized damage to vegetation, soil compaction and erosion, while increasing the chance of wildlife disturbance and disturbance to other visitors. These potential negative effects could be minimized through careful planning and management. Popular activities on site specific areas could be controlled to reduce impacts through proper design, site selection and construction technique or by restructuring participation through registration and fee systems. Although control of development would be exercised on Refuge land, off-site development would be controlled by other state and Federal regulations such as the Clean Water Act.

Restoration of the relatively small amount of crop land found in the Yellow River Focus Area to wildlife habitat would have minimal effects on total county employment, population, and the unemployment rate. Willing seller landowners would be appropriately compensated, while their employees, suppliers and brokers could experience some income reduction. Cumulative loss of crop land in the two-county area (due to such things as road construction, commercial and residential development, and other factors) would not jeopardize the agriculture infrastructure in the area.

1.5 Listed Species

Federally listed threatened or endangered species that utilize the Refuge include the bald eagle, eastern timber wolf, and Karner blue butterfly. The Yellow River Focus Area supports a small population of eastern massasauga rattlesnakes, which is a candidate for federal listing. The Refuge is currently a re-introduction site for an experimental population of whooping cranes. Under all alternatives, the Service is required by law to accommodate the needs of threatened and endangered species. Thus the following section would apply to all alternatives.

Bald Eagles

One occupied bald eagle nest currently occurs at the Refuge. However, numerous migrating bald eagles utilize Refuge habitats for resting and feeding.

Potential Impacts to Bald Eagle

Water Level Management
Current management practices on dozens of water impoundments on the Refuge provide bald eagles with a constant, year-round food source. Eagles feed primarily on fish but are known to prey on muskrats, waterfowl, American coots, and even white-tailed deer fawns. The Refuge manages most of its large water impoundments for moist soil plant production and to lower rough fish populations. This is accomplished by draining these pools every third year. During undrained years, water on these pools is held as high as possible. The Refuge staggers management of

these pools so the northern and southern end of the Refuge have at least one large drained pool per year. Management of this type is conducted to provide food for waterfowl migrating south during the fall. As a consequence, fish populations are reduced, which reduces the areas appeal for nesting bald eagles. However, these management practices simultaneously make the large water impoundments attractive for migrating bald eagles during the fall.

Aircraft Activity
Currently eagles on the Refuge face sporadic flights of both fixed and rotary-wing military aircraft. These aircraft are usually participating in training at Hardwood Bombing Range or Fort McCoy. Eagles don't currently nest in close proximity to any proposed whooping crane release sites. If eagles nest by one of these sites and whooping cranes are reintroduced, they would be exposed to daily ultra-light aircraft activity during whooping crane fledging.

Refuge Staff Activities
Refuge staff sometimes need to approach the eagle nest to perform other activities such as wildfire suppression, water level management, or other endangered species surveys. Too much activity around the nest could cause desertion.

Prescribed Burn Activities
At this time the Refuge's only active eagle nest is located in a prescribed burn unit. Prescribed burning during nesting could cause nest desertion.

Water Level Management Next to an Active Nest
The Refuge's only active eagle nest is located near a large water impoundment. Drainage of this pool could result in take by causing nest desertion or making food for the eaglets more difficult to obtain.

Access by the Public
The Refuge's only active eagle nest is located near a hiking trail in an area open to blueberry picking. Activity near the nest by the public could result in its abandonment.

Measures to Reduce Impacts on Bald Eagles

In regard to all forms of disturbance, with the exception of overhead flights by the Air National Guard and ultra-light aircraft activity associated with whooping crane releases, the "Bald Eagle Management Guidelines" (USFWS undated) will be incorporated on the Refuge.

In regard to overhead flights by the Air National Guard (ANG), locations of active nests will be provided to the ANG. As in the past, the ANG will provide these locations to their pilots and a half mile no-fly zone will be established around and above each active nest. If a pair of eagles should nest near a whooping crane release site, ultra-light aircraft activity will continue. However, the pilots will be notified of the eagle nest and required to maintain a half mile flight distance from the nest.

While active, no prescribed burns or water level draw-downs will occur within one-quarter mile of the nest. "Active nests" will include all site used within the two previous years. As eagles nest in oaks on the Refuge, their nest trees are unaffected by prescribed fires. As the conservation measures outlined above meet or exceed those outlined in the Bald Eagle Management Guidelines, all of these disturbances will have no effect on bald eagles.

Monitoring Bald Eagles

Bald eagle nests will be observed to document activity. Once a nest is deemed active, personnel will periodically observe the nest to determine if it was successful and how many young fledged.

Timber Wolves

Potential Impacts on Timber Wolves

Land Conversion
Early successional forests provide the maximum prey base for eastern timber wolves (USFWS 1992). Converting forested land to grassland could therefore reduce the prey available for wolves.

Public Access
Currently turkey hunters have nearly total access to all of the Refuge. Since wolf pups are born between early and mid-April, excessive activity around a den site could cause abandonment. As pups grow, the den site is abandoned and a rendezvous site is used (WIWP 1999). During this time (July 1st), almost the entire Refuge is open to berry pickers. Again, excessive disturbance around a rendezvous site could lead to abandonment.

Prescribed Burning
The Refuge has the ability to prescribe burn several thousand acres in a day. Prescribed burns of this size can overcome wildlife. Therefore, burning around den or rendezvous sites could result in wolf pup mortality.

Refuge Activities
Throughout the year, staff from the Refuge visit most of the property while conducting various activities. Excessive disturbance around a den or rendezvous site could lead to abandonment.

Hunting
The greatest perceived threat to wolves in Wisconsin is the 9-day gun deer season. During the gun deer season, all of the 600,000 hunters who possess a small game license are eligible to shoot coyotes while deer hunting in most of the state. The Refuge is an exception. However, most gun deer hunters on the Refuge are not from the area and may not know that coyote hunting is prohibited on the Refuge. Therefore, opening up nearly 100 percent of the Refuge to gun deer hunting has resulted in wolf mortality in the past and may continue to do so.

Measures to Reduce Impacts on Timber Wolves

Human-caused mortality is a major factor in many wolf populations. Hunters and residents within occupied wolf range have greater potential to directly impact wolf populations than the general public (Tucker and Pletscher 1989). Reduction of these contacts has been achieved on most of the Refuge by gating-off interior roads. The policy of maintaining gates on interior roads and berming access roads upon completion of timber sales will be continued.

Coyote hunting and trapping on the Refuge are prohibited and will remain closed year-round. In an effort to inform hunters about this closure, the Refuge will issue press releases yearly prior to the gun deer season. The Refuge will also post signs reminding hunters of the closure. The closure has been posted in the Federal Register and is printed in all of the Refuge's Hunting Pamphlets, which are available in leaflet boxes throughout the property.

Possibly the most critical portion of timber wolf habitat are den and rendezvous sites (Wydeven and Schultz 1993). Wolf packs usually use one or two dens per year with movement to a new den site associated with disturbance. After the denning period, the alpha female moves the litter to a home site(s) or activity site(s) called a 'rendezvous site'. The potential for wolf populations to increase and expand is directly related to pup survival. Therefore, all actively used wolf home sites (den and rendezvous sites) verified by a wildlife biologist and used within the last 2 years will be protected. Active den and rendezvous sites will be protected by following guidelines established in the Wisconsin Wolf Management Plan (1999), which requires all disturbances within 100 meters of a den or rendezvous site be eliminated. The only exceptions to this will be activities associated with proposed whooping crane releases and for safety reasons such as dam operations on large water impoundments and wildfire suppression. The Refuge will meet or exceed guidelines established in Wisconsin Wolf Management Plan, and there will be no effect on wolves.

Monitoring Timber Wolves

Personnel will continue to track wolf distribution and will conduct winter tracking surveys. Personnel will conduct howling surveys in late May or early June to monitor pack production and aerial monitoring of radio collared wolves to determine pack territory and obtain dispersing information.

Karner Blue Butterflies

Potential Impacts on Karner Blue Butterflies

Wildfire Suppression

Wildfire is one of the driving forces in savanna creation and maintenance. Both the Wisconsin Department of Natural Resources and U.S. Fish and Wildlife Service aggressively control all wildfires on the project lands for financial and legal reasons. Wildfire suppression is mandatory for these reasons, but has a very negative effect on KBB habitat. In an effort to mitigate the effects of wildfire suppression, the Refuge will conduct prescribed burns. As the purpose of these burns will be to mimic the effects of wildfires, some units will be burned in consecutive years if succession is threatening a Karner blue butterfly population.

Prescribed Fire

Prescribed fire is currently used on the project lands to maintain KBB habitat. Surveys on the Refuge show a strong positive correlation between the frequency of prescribed burning and KBB densities. The Refuge tested the effects of burning on Karner blue butterfly habitat with a study design that incorporated both replicates and control sites (King *in litt* b). No other research of this quality exists. This work concluded that wild lupine as well as nectar sources (Karner blue

butterfly habitat) were unaffected by the treatments. Again, the effects of burning of KBB populations was tested with a study design that incorporated both replicates and controls. Again, prescribed burning had no short (1 year) or long-term (2 or 3 years) detectable effect on KBB populations (King *in litt* b). Although all evidence indicates that KBBs survive fire as adults and eggs (King *in litt* a; King *in litt* b), it is conceivable that individual KBBs could be lost during prescribed burning operations.

Mowing

Similar to prescribed burning, controlled and replicated experiments have demonstrated that mowing has no detectable effect on KBB habitat or populations (King *in litt* b). However, it is conceivable that an individual KBB could be killed by mowing.

Refuge Activities

Silviculture practices are the only other Refuge activities that have the potential to impact KBBs. Land conversion through tree plantings is often cited as negatively affecting KBB population, however the Refuge doesn't plant trees. Timber sales aimed at controlling disease and pest outbreaks like oak wilt, jack pine budworm, and two-lined chestnut borer for silvicultural purposes have a negative impact on KBBs because these are natural precesses that help to create and maintain KBB habitat.

Foot Travel

Foot travel through KBB habitat on existing trails could have negative impacts on KBBs if eggs or larvae are stepped on. Maintenance of existing trails is accomplished by annual mowing, which could conceivably result in the loss of an individual KBB, although this would be very unlikely. Establishment of more trails on the Refuge could result in the take of KBB if wild lupine plants are destroyed.

White-tailed Deer

White-tailed deer browse on savanna plants, including wild lupine, has been high on the Refuge. The Refuge surveyed the number of browsed and unbrowsed lupine flower stems on one KBB site in the spring of 1994 and found that 85 percent of all wild lupine stems were browsed.

Succession

If unchecked, succession will destroy KBB habitat and eliminate populations. Currently three KBB populations are located on unmanaged tracts of land and face certain extirpation unless some form of disturbance or disturbances are returned to the landscape.

Measures to Reduce Impacts on Karner Blue Butterflies

The effects of each potential impact of land management activities on KBB population on the project lands will not be monitored. Instead, the effects of all potential impacts will be mitigated by restoring and maintaining enough habitat to restore one large KBB population on the Refuge. The Refuge will be restoring approximately 3,000 additional acres of savanna, which will bring its total savanna habitat to approximately 3,500 acres. The 3,500 acres will be distributed between 35 sub-sites that will be distributed over approximately15 square miles. Enough savanna habitat will be restored and managed on the Refuge to insure a minimum population of 6,000 to 7,000 second flight adults.

In regard to all outlined activities that have the potential to effect existing KBB populations, the Refuge will incorporate the terms set forth in the Biological Opinion prepared for the Refuge CCP (Appendix I). Specifically, the Refuge will incorporate the following conservation measures:

Foot travel

The public will be encouraged to restrict foot travel to existing trails through occupied KBB habitat. Blueberry pickers will be allowed to travel throughout occupied KBB habitat as the blueberries they seek are also distributed throughout the savannas. The Refuge staff will keep foot travel activities to a minimum while on occupied KBB habitat. Netting, handling, and marking KBBs will also be kept to minimum.

Untreated Land

The Refuge will leave at least one untreated KBB site on the southern end (south of Hanson Road) of the Refuge in any given year. Likewise, one untreated KBB unit will be left on the north end of the Refuge in any given year. All other units can be treated (mowed or burned) in a given year. Recently published KBB dispersal research on the Refuge (King 1998) demonstrates that leaving one untreated unit on the southern portion of the Refuge and one on the north will provide "refugia" for the entire Refuge. The dispersal ability of the KBB makes the refugia approach work for the Refuge. Within the open landscapes of the Refuge, 10 percent of all KBB with multiple captures were shown to travel at least 1.4 miles during the second flight of 1995. One individual, a female, traveled at least 4.1 miles during the same flight (King 1998).
As previously stated, research on the Refuge has shown that KBB populations are unaffected by burning or mowing. Therefore, even if we conservatively assume that mowing or burning result in take of some individual KBB eggs or larvae, research on the Refuge has demonstrated that this take has no effect at the population level. In that respect, leaving refugias on the Refuge will be a back-up plan should the effects of burning or mowing differ dramatically from the past. The Refuge will take the same approach when mitigating the effects of succession. If succession is threatening a population, that unit will be burned or mowed repeatedly, in consecutive years, until the threat of succession is removed. As burning and mowing have no effect on KBB populations (King *in litt* a, King *in litt* b) these conservation measures will pose no threat to KBB populations even if we conservatively assume that some individual KBBs could be affected. In fact, most of the Refuge's best KBB sites, in regard to density, have a history of being burned in two or more consecutive years.

Mowing

For KBB areas that are mowed, including trails, blade height will be at least 8 inches from the ground. Mowing will not occur between April 15 and August 15 when KBB larvae may be present.

By implementing the conservation measures listed above, the Necedah National Wildlife Refuge will be effectively eliminating all Karner blue butterfly take. In the cases of burning and mowing, the Refuge will be conservatively assuming take of individual KBB eggs or larvae can occur, although there is no support for this in peer reviewed literature. However, the potential effects of that take will not be mitigated as, if they occur, they have been shown to have absolutely no effect on Karner blue butterfly populations (King in litt a).

Monitoring Karner Blue Butterflies

The Refuge will monitor all KBB populations on the Refuge with Pollard-Yates type surveys during only the KBB's second flight each year. Surveys will be conducted only on the dedicated savanna sites and only during the second flight. The surveys will be done on each site three times during the second flight. Spacing of 7 days will be used between subsequent surveys on each site. Spacing of 7 days will be used between counts because mark-release-recapture research at the Refuge has shown that the risk of counting the same KBB on subsequent surveys is reduced to 5 percent with this spacing (King 1998). Assuming that each KBB counted is a separate individual is useful because a sum of all the counts on a unit as opposed to a mean can be used. The number of KBBs annually counted on the units will then be used to show trends on the Refuge, which will be used to demonstrate that the Refuge is still meeting the criteria for a large population.

Eastern Massasauga Rattlesnake

Potential Impacts on the Eastern Massasauga Rattlesnakes

Wetland Drainage
Eastern massasauga rattlesnakes hibernate below the water-line. They therefore require high, stable water levels in the winter. Drainage of a wetland could eliminate an area as suitable habitat for hibernating Eastern Massasauga Rattlesnakes.

Prescribed Burning
Eastern massasauga rattlesnakes have been burned during prescribed burn operations on other National Wildlife Refuges. Burning after snakes emerge from hibernation can result in mortality.

Mowing
Mowing while eastern massasauga rattlesnakes are active can result in mortality. This mortality can be hard on populations as gravid females often seek-out areas that are both dry and warm. Mowing these areas at the wrong time can eliminate gravid females as well as her young.

Succession
Massasauga require open landscapes. In closed canopy forests they loose basking opportunities, which are particularly critical for gravid females. As trees grow-up, they also provide perches for raptors that have been shown to substantially affect massasauga populations. Succession has degraded habitat both on the Refuge and the Yellow River area.

Measures to Reduce Impacts on Eastern Massasauga Rattlesnakes

The Refuge will not be conducting any massasauga-related activities on the Refuge proper. In regard to the Wildlife Management Agreements with landowners, the Refuge will incorporate methodology outlined in *The Eastern Massasauga Rattlesnake: A Handbook for Land Managers*: 2000 (Johnson et al. 2000). By following this handbook, the Refuge will be eliminating all take of eastern massasauga rattlesnakes.

Monitoring Eastern Massasauga Rattlesnakes

The Refuge will conduct massasauga surveys for all the Candidate Conservation Agreements it is working on. The Refuge will survey eastern massasauga rattlesnakes with the methodology set forth in the "Recommended Standard Survey Protocol for the Eastern Massasauga, *Sistrurus catenatus catenatus*" (Capser et al. 2001).

Whooping Cranes

Whooping crane chicks were introduced at the Refuge in the summer of 2001as part of a whooping crane reintroduction project to establish a migratory population in the eastern U.S. to contribute toward recovery of the species. The population has been designated as a non-essential population (NEP) in a rule making action finalized on June 26, 2001. The crane chicks are being reared in a pen situation and trained to follow ultra light aircraft in migration to a selected wintering site at Chassahowitzka National Wildlife Refuge. Annual whooping crane introduction, rearing, and release activities are expected to continue for a period of 10 years.

The introduction project itself is covered by a separate EA and separate Biological Opinion (Appendix 1) prepared by the Service's Green Bay Ecological Service's Field Office.

1.6 Maintenance of Roads and Existing Right-Of-Ways

State, county, and townships retain maintenance obligations for roads and their rights-of-way under their jurisdiction within Refuge boundaries. Some township roads may be suited for abandonment (but not necessarily closure) and their maintenance assumed by the Service. Any such abandonments would only be with the consent of the appropriate governing body. Existing rights-of-ways and terms of other easements will continue to be honored. New rights-of-ways and easements will be considered in relation to Refuge System regulations and likely impacts of the rights-of-way or easement to Refuge resources.

The Refuge would cooperate with state, county and township officials in the maintenance of roads that cross the Refuge. Roadside mowing would be completed in accordance with State and local laws.

1.7 Prescribed Fire

Social Implications

Prescribed burns will have an effect on the local public. The Village of Necedah and the surrounding area total about 3,000 permanent residents, with an additional 1,000 people during the tourist season. Public concern is noticed every time a fire is set. This has ranged from a mere inquiry from a local merchant to a party of three men traveling about 20 miles to volunteer their services at what they thought was a wildfire. A prescribed burn will effect and benefit the local community in many ways. Because this area of Wisconsin is a higher risk fire area than most places, these benefits must be explained to the public at every opportunity. The Refuges Fire Management Plan (FMP) provides additional detail beyond what is captured in this section and will be adopted through this EA.

A prescribed burn on the Refuge will be a direct benefit to the public in creating recreational areas for such activities as blueberry picking and increased wildlife populations for hunting and observation. If a wildfire is started on or near the Refuge, the areas that were previously prescribed burned and the firebreaks intended for prescribed burning will be of extreme benefit in controlling the fire.

The aspect of the fire that will solicit the most public concern will be the smoke. Smoke from a Refuge fire could impair visibility on roads and become a hazard. Actions to manage smoke include: use of road guards and pilot car, signing, altering ignition techniques and sequence, halting ignition, suppressing the fire, and use of local law enforcement as traffic control. Burning will be done only on days that the smoke will not be blown across the community or when the wind is sufficient as not to cause heavy concentrations.

As of the writing of this the FMP, the State of Wisconsin has no restrictions on the use of prescribed burning relating to air quality. The FMP will be revised if smoke regulations are issued. Combustion of fuels during prescribed fire operations may temporarily impact air quality, but the impacts are mitigated by small burn unit size, the direction of winds the burns are conducted with, and the distance from population centers. All efforts will be taken to assure that smoke does not impact smoke sensitive areas such as roads and local residences. In the event of wind direction changes, mitigative measures will be taken to assure the public safety and comfort. Refuge staff will work with neighboring agencies and in consultation with State air quality personnel to address smoke issues that require additional mitigation.

The fire prescription portion of the Annual Prescribed Fire Plan for each unit proposed to be burned during the burning season will have specific mitigative measures to deal with unexpected smoke management problems. This will included identified problems that unforecasted wind changes may cause and measures to be employed to protect the public.

The emotional impact of a prescribed fire on the local residents must also be considered. In past years the area has experienced some rather severe wildfires that destroyed much property. The years of 1968, 1976, 1977, and 1980 were particularly bad. For this reason, a great deal of public concern will arise with any kind of smoke from the Refuge. This concern can be relieved only by a concerted effort by Refuge personnel to carefully inform the local citizens about the prescribed burning program. Emphasis will be placed on the benefits to wildlife as well as the safety precautions in effect. Formal interpretive programs both on and off the Refuge, explaining the prescribed burning program, will be encouraged.

Cultural and Archaeological Resources

According to the Refuge Master Plan there are archaeological sites within prescribed burn units. When these units are burned, it is doubtful that the fire will have any adverse impact on the sites. The fire will be only a temporary disturbance to the vegetation in the area and in no way destroy or reduce the archaeologic value. All artifacts are buried well beneath the surface. No above ground evidence exists. No known sites will be impacted by prescribed burning operations.

Flora

The prescribed burning program will have a visible impact on vegetation and the land. Immediately after a fire much of the land will be blackened. There will be no grasses or ground forbs remaining and most of the higher brush such as oak sprouts and willow will be bare of leaves. Trees will be scorched up to 20 feet above the ground. This will be particularly noticeable on the light colored bark of aspen and birch. There may be large areas up to one acre in size interspersed throughout the burn that are untouched by the fire. This may be a result of wet ground conditions or a break in fuel continuity.

Within three days after the burn the grasses and forbs will begin to grow. The enriched soil will promote rapid growth such that after two or three weeks the ground will be completely covered. The willow and oak will, in many cases, re-sprout. The bases of the trees as well as the burned slash and stumps will be partially or completely covered by the new growth. Some of the less fire resistant trees will show signs of wilting and may succumb within a month or two. Generally speaking, after one seasons regrowth, any sign of the prescribed burn will be difficult to detect without close examination. After two or three years it will be virtually impossible to detect the presence of the fire.

Other more long lived signs of the burn will remain for an indefinite period of time. The firebreaks will not be allowed to grow over as their benefit could be realized in a wildfire situation as well as in future prescribed burns. Vehicle tracks through the burn are visible on the freshly burned ash and may be longer lived if the vehicle became stuck or created tire grooves in the ground. Travel across the burn area will be kept to a minimum. Vehicle travel is necessary in some instances, such as lighting the fire lines or quickly getting water to an escape break-over point. The fire plow will be used only in the event that a break-over does occur and cannot be controlled by any other method. The deep trench of the plow would leave a very long lived scar. This trench could be repaired by filling, which would eliminate it from view after five to ten years.

Listed Species

The potential impacts of fire on listed species and measures the Refuge will use to reduce those potential impacts are discussed above in section five “Listed Species”.

Soils

The disturbances to the soil by fire are similar to those caused by any other manipulative practice applied to the land. A farming, logging, or flooding operation will have no greater or lesser impact. All three are applied on the Refuge at the present time.

Severe and repeated fires of the early 1900's greatly altered the soil and cover type of the area. Many of the heavy bog and marshland soils were drained and burned to create upland cover types supporting aspen, jack pine, and other hardwood types on light sandy soils. The effect of fire to the soil is dependent largely on the fire intensity and duration. On areas such as Prairie Restoration, Research Natural Areas, Oak Savannas and forest logging sales a slow backing fire is usually required for containment and desirable results. The intense heats generated by this type

fire to kill unwanted plant species or remove slash will have a greater effect on the soils than fast, cool head-fires used on farm fields and wildlife openings. The cool, moist soils of the lower parts of these units will be unaffected by the fire.

The severity of damage to the soil depends also to a great degree on the thickness and composition of the organic mantle. In many cases where only the top layer of the mantle is scorched or burned, no damage will result to the soil below. This is usually experienced in the forested areas of the burn units.

On open areas such as the Prairie Restoration, Wildlife Openings, Oak Savannas and Natural Areas, the blackening of the relatively thin mantle will cause greater heat absorption and retention from the sun. This will encourage earlier germination during the spring growing season.

Nutrient release occurs as a result of the normal decomposition process. Fire on the soil will greatly speed up the process. The rate and amount of nutrients released will again be dependent on the fire duration and intensity as well as the amount of humus, duff and other organic materials present in the mantle. The increase, immediately after a burn, of calcium, potash, phosphoric acid and other minerals will give the residual and emergent vegetation a short term boost. However, the rapid leaching through the sandy soils will cause rapid runoff of these nutrients and only short term benefits. The increased nutrification of the soil by the emergent vegetation and increased nutrient release result in rapid regrowth of grasses and other succulent vegetation on the sites.

There is no evidence to show that the direct heating of the soil by the burning of material above it with a fire of low intensity has any significant adverse affect. Fire on these types of soil has little total affect on the soils, and in most cases would be beneficial.

Escaped Fire

With any prescribed fire there always exists the possibility of its escape into the surrounding area. This can be caused by one or more factors which may be preventable or non-preventable. Inadequate firebreaks, too few personnel, unpredicted changes in weather conditions, peculiar fuel type, being in too big a hurry, and insufficient knowledge of fire behavior are a few factors which could cause loss of control. There is no doubt that an escaped fire could turn into a very serious situation. The damage that could result would be much less severe on the Refuge than if it encroached on private land where buildings, equipment, and land improvements would be involved. At least 90% of the prescribed burn areas are well within the Refuge and of minimal threat to private or other improved lands in the event of an escape breakover. Extreme care, careful planning, and adherence to the unit prescription will be exercised when prescribed burning all units with emphasis employed when burning areas that are near or adjacent to the Refuge boundary.

In the event that a prescribed fire does jump a firebreak and burn into unplanned areas, there is a high probability of rapid control with minimal adverse impact. The network of firebreaks and roads will greatly assist in rapid containment. In most cases all of the Refuge fire fighting equipment will be immediately available at the scene with all nearby water sources previously located. The DNR fire suppression crew in Necedah will always be notified of a prescribed

burn. Thus, maximum numbers of experienced personnel and equipment are immediately available for wildfire suppression activities.

To the north, south, and west, there is very little developed land within twelve miles of the Refuge. The Village of Necedah and unincorporated towns of Sprague and Finley all lie along the eastern Refuge boundary. The urban interface with these municipalities are sparsely developed at this time, but developments are increasing. Parcels that formerly consisted of small seasonal cabins are frequently being replaced by new permanent year-round residences. The threat of wildfire potential along this interface and the need to reduce fuel loadings and maintain a wider firebreak along the eastern Refuge boundary has recently been identified as a priority in the Forest Management Plan and the CCP. There is also a very small, yet significant possibility of escaped prescribed fire impacting this area. Savanna restoration and fuel reduction projects that are anticipated to begin by 2002 will begin to address this threat.

1.8 Cultural Resources

Under all alternatives, the Service will take into consideration impacts on historic properties and other cultural resources from Refuge undertakings (e.g., activities, projects, and uses). Nevertheless, some loss could still occur. Any development (e.g., dikes, roads, buildings, etc.) would only be carried out after a thorough review or survey of possible cultural resources likely to be disturbed, and plans for avoidance or minimizing impacts are in place. The Service will inform state Historic Preservation Officers of any acquisition of lands and structures. Structures considered to meet the criteria for the National Register will be maintained until the Service's Regional Historic Preservation Officer can complete an evaluation and appropriate mitigation is accomplished. Buildings and other structures will be maintained until the Service can consider how the historic property can be retained and used for Refuge purposes.

A description of undertakings for all Refuge lands would be provided by the Refuge Manager to the Regional Historic Preservation Officer who will analyze the undertaking for potential effects on historic properties. The Refuge Manager will inform the Regional Historic Preservation Officer of each undertaking during early planning. The Regional Historic Preservation Officer will enter into consultation with state Historic Preservation Officers and other parties as appropriate. No undertakings will proceed until the Section 106 process is complete. Also, the Refuge Manager will, with the assistance of the Service's Regional Historic Preservation Officer, develop a program for conducting Section 110 inventory surveys, and will attempt to obtain funding for those surveys. The Refuge Manager will similarly involve the Regional Historic Preservation in other cultural resources issues on the Refuge.

1.9 Environmental Justice

Within the spirit and intent of Executive Order 12898, no minority or low income populations would be impacted by any Service action under any alternative.

1.10 Climate Change

The increase of carbon within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive

conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's *"Carbon Sequestration Research and Development*" (U.S. DOE, 1999) defines carbon sequestration as "...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, perpetual ice and desert – are effective both in preventing carbon emission and acting as a biological "scrubber"of atmospheric carbon monoxide. The Department of Energy report's conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere. Preserving natural habitat for wildlife is the heart of any long range plan for national wildlife refuges. The actions proposed in this comprehensive conservation plan would preserve or restore land and water, and would thus enhance carbon sequestration. This in turn contributes positively to efforts to mitigate human-induced global climate changes.

2. IMPACTS ASSOCIATED WITH SERVICE TRUST RESOURCES

2.1 Alternative 1 (No Action)

Under Alternative 1, the Refuge would continue to operate under the 1979 Master Plan and subsequent step-down management plans (maintains the status quo in management). The Refuge's Forest Management and Fire Management Plans articulate future open landscape developments, which would benefit some Service trust resources (see Habitat Management section below). However, Alternative 1 does not provide the Refuge a future vision, prioritize management activities Refuge-wide, or hold the Refuge accountable for management results through a monitoring and evaluation program. With less coordination among the conservation organizations, this alternative would probably result in less efficient conservation efforts of Service trust resources on the Refuge and within the Yellow River Focus Area. In the meantime, opportunities to work at the landscape scale for the benefit of Service trust resource in the Yellow River Focus Area would rapidly disappear.

Listed Species

Alternative 1 would have a positive impact on threatened and endangered species that utilize Refuge open landscape lands. Protection of federally-listed species on the Refuge would continue under existing laws and regulations. This alternative might not, however, focus Service restoration and habitat management activities to benefit both federally and state-listed species.

Since the Refuge's Forest Management Plan and Fire Management Plan articulate restoration and preservation of additional open landscape habitats on the Refuge, local populations of Karner blue butterflies would likely increase over the long-term. However, management actions aimed at restoring and maintaining open landscape habitat (mowing, burning, hydro-axing) could impact individual Karner blue butterflies and eastern massasauga rattlesnakes (see section 1.5 above). However, over the long-term, these populations would benefit from the net gain in savanna habitat that would be restored and preserved.

Nesting bald eagles on the Refuge would be afforded protection from human disturbance consistent with the Service's Bald Eagle Management Guidelines (USFWS undated).

Refuge habitat would be managed to support whooping cranes and eastern timber wolves, which would benefit their populations over the long-term. A separate EA has been prepared to evaluate the re-introduction of an experimental population of whooping cranes on the Refuge. The "General Impact Analysis" section above provides additional detail relative to potential impacts to listed species, including eastern timber wolves.

Waterfowl and Other Migratory Birds

Under this alternative, the Refuge would not produce any major change in waterfowl production or use at the Refuge, since there would not be an appreciable increase in nesting, resting, or feeding habitats (grasslands and wetlands) in the immediate area, or the quality of existing Refuge habitats would not improve appreciably (see "Habitat Management" section below). In the long-term, local waterfowl populations could decline as existing wetland habitats degrade and other natural and anthropogenic forces take their toll.

Alternative 1 would benefit savanna species of concern (red-headed woodpeckers, bobolinks, etc.) through additional savanna habitat management on the Refuge. However, other species on the Refuge, such as those associated with mature closed-canopy upland forests (scarlet tanagers, wood thrushes, eastern wood peewees) would probably experience local declines as those forests are converted to open landscape lands. However, the landscape surrounding the Refuge provides an abundance of mature closed-canopy forest habitat (see Table 7 in Chapter 3) and those bird species would be expected to relocate into those adjacent habitats. Further, conversion of closed-canopy forests to savanna landscapes would occur gradually over an extended period of time (>15 years).

Grassland bird species of concern would probably continue to decline on the Refuge as the Refuge would not make restoration and conservation of additional grasslands a priority under this alternative.

Many bird species considered priority conservation species by the Service and the state, and which are found in the forested wetlands and associated habitats in the Yellow River Focus Area (cerulean warbler, red-shouldered hawk, acadian flycatcher, yellow-crowned night heron, sedge wren, prothonotary warbler, Louisiana waterthrush) would not be afforded any habitat protection under this alternative. As the area develops and degrades due to lack of habitat management actions, many of these species would likely decline.

Native Biological Diversity

Under Alternative 1, we anticipate increased biological diversity on the Refuge from additional savanna restoration and management efforts per guidance contained in the Refuge's Forest Management Plan and Fire Management Plan. This would include increased numbers of many game species also, including turkey and sharp-tail grouse, as well as small mammals, invertebrates, reptiles, and amphibians. However, since the Refuge would not take an active role in restoring and preserving habitats in the Yellow River Focus Area aside from its private lands

effort, we anticipate that the quantity and quality of wetlands, bottomland forests, and open landscapes in the area would continue to decline due to lack of habitat management and development, as well as wildlife species richness and abundance.

2.2 Alternative 2

Under Alternative 2 management actions relative to the significant issues identified during scoping would follow guidance contained in the 1979 Refuge Master Plan.

Significant changes have occurred in the art and science of natural resource management since the writing of the 1979 Master Plan. The Service's "ecosystem approach" is an example of the implementation of a new management paradigm, as is the development of regional resource conservation priority species (see CCP chapter 2). Waterfowl, migratory birds, and listed species would not benefit from this new knowledge if the Refuge continued to be guided by an outdated plan and information. Also, the status of Service trust resources have changed since the writing of the 1979 Master Plan due to successful conservation strategies (e.g., the recovery of the bald eagle), and unsuccessful conservation strategies (e.g., the declining status of many grassland-dependent bird populations across the region). The 1979 Master Plan does not take into account these or many other changes, and would not enable the Refuge to adequately address Service trust resource needs. In addition, with less coordination among the Service and the conservation community, this alternative would result in less efficient conservation efforts of Service trust resources. In the meantime, like Alternative 1, opportunities to work at the landscape scale in the Yellow River Focus Area for the benefit of Service trust resources would rapidly disappear as development and other anthropogenic forces take their toll.

Listed Species

Alternative 2 would have little or no direct impact on threatened and endangered species that utilize the Refuge, with the exception of Karner blue butterflies. Protection of federally-listed species on the Refuge would continue under existing laws and regulations. This alternative might not, however, focus Service restoration and habitat management activities to benefit both Federally and state-listed species. Since no major effort would be made to restore and preserve additional open landscape habitats on the Refuge or Yellow River Focus Area, local populations of Karner blue butterflies would likely remain the same.

Under certain circumstances, management action aimed at restoring and maintaining habitats for listed species, such as mowing, burning, and hydro-axing, may have short-term adverse effects on some listed species the Refuge is trying to benefit (Karner blue butterflies and eastern massasauga rattlesnakes)(see section 1.5 above).

Eastern massasauga rattlesnakes would likely decline over the long-term as development encroaches the Yellow River area.

Nesting bald eagles on the Refuge would still be afforded protection from human disturbance consistent with the Service's Bald Eagle Management Guidelines (USFWS undated).

The Refuge would manage habitat to support whooping cranes and eastern timber wolves, which

would benefit their populations over the long-term (a separate environmental assessment (EA) and separate Biological Opinion was prepared by the Service's Green Bay Ecological Service's Field Office to cover re-introduction and management of whooping cranes). Additional information on eastern timber wolves can be found in section 1.5 above.

Waterfowl and other Migratory Birds

Alternative 2, like alternative 1, would result in no direct change in waterfowl production or use at the Refuge since there would not be an appreciable increase in nesting, resting, or feeding habitats (see "Habitat Management" section below) within the Refuge or the Yellow River Focus Area, or the quality of existing Refuge and Yellow River Focus Area habitats would not improve appreciably. In the long-term, local waterfowl populations could decline as existing wetland habitats degrade and other natural and anthropogenic forces take their toll.

Similarly, alternative 2 would result in no direct change in migratory bird production or use at the Refuge since there would not be an appreciable increase in nesting, resting, or feeding habitats within the Refuge, nor would the quality of existing habitats improve appreciably. In the long-term, local wetland and grassland-dependent migratory bird populations would likely decline as existing habitats degrade and predation, artificially heightened by fragmented landscapes, continues to take its toll on nesting females and their young.

Many bird species considered priority conservation species by the Service and the state, and which are found in the forested wetlands and associated habitats in the Yellow River Focus Area (cerulean warbler, red-shouldered hawk, acadian flycatcher, yellow-crowned night heron, sedge wren, prothonotary warbler, Louisiana waterthrush) would not be afforded any habitat restoration or protection under this alternative. As the area develops and degrades due to lack of habitat management and protection, many of these species would likely decline.

Native Biological Diversity

Under Alternative 2, no effort would be made to manage for increased biological diversity on either Refuge land or land within the Yellow River Focus Area by the Refuge (ie. no new wetlands, savannas, or grasslands restored). Over the long-term, species richness and abundance on the both the Refuge and within the Yellow River Focus Area would be expected to decline. No additional open landscape land (grasslands/savannas) would be developed on the Refuge or within the Yellow River Focus Area. No new wetlands would be restored and managed on the Refuge. Some small increases of wetland habitat could occur in the Yellow River Focus Area through other non-Service programs.

2.3 Alternative 3

Alternative 3 would have the greatest positive impact on Service trust resources.

Listed Species

Alternative 3 would have the greatest benefit to listed species by restoring, preserving, and managing additional wetland and open landscape habitats on the Refuge and within the Yellow River Focus Area (see "Habitat Management" section below).

Under certain circumstances, management action aimed at restoring and maintaining habitats for listed species, such as mowing, burning, and hydro-axing, may have short-term adverse effects on some listed species the Refuge is trying to benefit (Karner blue butterflies and eastern massasauga rattlesnakes)(see section 1.5 above).

Through additional savanna habitat management, local populations of Karner blue butterflies would likely increase over the long-term.

Local populations of massasauga rattlesnakes would likely increase as additional habitat is restored and preserved in the Yellow River area.

Nesting bald eagles on the Refuge would still be afforded protection from human disturbance consistent with the Service's Bald Eagle Management Guidelines (USFWS undated).

Refuge habitat would be managed to support whooping cranes and eastern timber wolves, which would benefit their populations over the long-term (a separate environmental assessment (EA) was prepared by the Service's Green Bay Ecological Service's Field Office to cover re-introduction and management of whooping cranes). Additional information on eastern timber wolves can be found in section 1.5 above.

Waterfowl and Other Migratory Birds

Alternative 3 would increase waterfowl production (primarily mallards, teal, and pintails) and use at the Refuge by increasing the quantity and quality of nesting, resting, and feeding habitats available to local and migratory populations (see "Habitat Management" section below and attached CCP). As more grasslands are established, nesting success would increase as birds disperse their nests over a larger area, thus creating a larger area that predators must search. Additional resting and feeding habitats (wetlands) would also disperse staging birds over a larger area and decrease the chance of catastrophic accident or disease, such as avian botulism. Additional feeding habitats on the Refuge would help ensure that migrating ducks arrive on their northern breeding grounds in better reproductive condition.

Alternative 3 would benefit other migratory bird species also by providing additional nesting, resting, and feeding habitats (wetlands, grasslands, and savannas). Several species of special management concern would benefit directly. These include the American bittern, upland sandpiper, least bittern, black tern, red-shouldered hawk, northern harrier, dickcissel, short-eared owl, sedge wren, loggerhead shrike, grasshopper sparrow, vesper sparrow, savannah sparrow, field sparrow, bobolink, and eastern meadowlark

However, other species on the Refuge, such as those associated with mature closed-canopy upland forests (scarlet tanagers, wood thrushes, eastern wood peewees) could experience declines on the Refuge as those forests are converted to open landscape lands. However, the landscape surrounding the Refuge provides an abundance of mature closed-canopy forest habitat (see Table 7 in Chapter 3) and those bird species could relocate into those adjacent habitats. Further, conversion of forest land to open landscape habitat would occur over an extended period of time (>15 years).

Restoration, protection, and management of riparian areas, wetlands, wet prairies, sedge meadows, and associated grasslands on the Refuge and in the Yellow River Focus Area would create and protect habitats essential for many nesting and migrating songbirds, and should contribute to the long-term recovery of some neotropical migrant populations (cerulean warbler, red-shouldered hawk, acadian flycatcher, yellow-crowned night heron, sedge wren, prothonotary warbler, Louisiana waterthrush).

Native Biological Diversity

Alternative 3 would increase and preserve biological diversity by restoring and preserving additional diverse habitats on the Refuge and within the Yellow River Focus Area, including seasonal wetlands, wet meadows, native prairies, and riparian associations. Once restored, these areas could create a number of interconnected habitat niches for indigenous and migrant wildlife that currently do not exist at the Refuge, thus increasing the overall biological diversity of the Refuge and surrounding area. This would include increased numbers of many game species also, including turkey and sharp-tail grouse. In particular, this alternative would focuses the restoration of large, native grassland blocks, and the management of the surrounding landscape that will establish a favorable landscape for the management of area-sensitive grassland birds. Moreover, alternative 3 would attempt to restore the links (ie. suitable matrix) between the historic wetlands, prairies, and oak savanna ecosystems found on the Refuge, which would also contribute to enhanced biological diversity.

Since this alternative emphasizes the greatest habitat preservation, restoration and enhancement, it would also result in the greatest benefit to resident wildlife, such as those species that help sustain natural biological systems that support Service trust resources like muskrat, raccoon, mink, weasel, reptiles, river otter, amphibians and reptiles. In addition, as water quality improves from habitat treatments in the Yellow River watershed, important resident game fish populations would be expected to increase in proportion to the amount of quality habitat made available on the Refuge, thus increasing the food supply for many fish-eating wildlife.

Under this alternative, the following “Guiding Principles” will be followed when restoring habitats on the Refuge and within the Yellow River Focus Area.

- *Use an Ecosystem Approach:* The ecosystem approach is a vision of desired future conditions developed in collaboration with a diverse group of stakeholders that integrates ecological, economic, and social factors. It is applied within a geographic framework (usually watershed) and is founded primarily on ecological factors.

- *Results through Partnerships:* Partnership initiatives require extensive coordination and communication between Federal agencies; state, tribal, and local governments; and stakeholders and customers. Partnerships promote the pooling of resources and expertise to obtain results more quickly and efficiently. Results also tend to be longer lasting because consensus is built over a wide range of stakeholder interests.

- *Ensure Public Involvement:* Refuge management will include a clear, credible, and meaningful role for public input from the full spectrum of social and cultural backgrounds, and will

receive full consideration in Refuge decision-making. The Refuge serves local, state, and national constituencies, therefore, public input at each of these levels will be solicited and considered.

- *Cornerstones of Biology:* The Refuge will preserve existing, relatively intact ecosystems first; for they are the cornerstone for providing biota and other natural materials needed for future restoration.

- *Ecological Integrity:* The Refuge will restore ecological integrity, particularly the structure, composition, and natural processes of native biotic communities and physical environments.

- *Design for Self-Sustainability:* The Refuge will design for self-sustainability of natural systems. The best way to ensure long-term viability of habitat is to minimize the need for continuous maintenance.

- *Within a Watershed Context:* The Refuge will focus within the watershed and/or broader landscape level context and seek to understand its biological potential. A watershed/landscape has the capacity to become only what its physical and biological setting will support. This includes climate, geology, hydrology, and biological characteristics.

- *Address Degradation:* The Refuge will address ongoing causes of habitat degradation. Protection, restoration, and management activities will fail if the sources of degradation persist.

- *Have Clear Goals and Objectives:* The Refuge will have clear, up-to-date goals, objectives, and strategies, and will include a diverse array of expertise and interests in their development.

- *Use Passive Restoration:* The Refuge will use passive restoration and management when appropriate. Where possible, simulate natural hydrological process using low input, low impact, and sustainable measures that capture the energies of the system to perpetuate the resources in question.

- *Use Reference Sites:* The Refuge will, whenever available, use reference sites when restoring habitat. Reference sites are areas that are comparable in structure and function to the proposed restoration before it was degraded.

- *Adaptive Management Processes:* An adaptive management approach features a structured, iterative process that recognizes that most information used in decision making is incomplete. Adaptive management guides managers in efficiently collecting and using better information, thus enabling appropriate mid-course corrections.

3. IMPACTS ASSOCIATED WITH VISITOR SERVICES

3.1 Alternative 1

Under Alternative 1, the 1979 Master Plan and associated step-down plans (e.g., public use, sign, law enforcement plan, etc) would be used to guide visitor services on the Refuge. Visitation at the Refuge would continue to increase due to recent Refuge developments (whopping crane project, savanna restorations) while the quality of visits would probably decline due to lack of adequate infrastructure.

Increased visitation could generate the development of additional on-site facilities, such as improvements to visitor facilities, parking areas, trails, observation towers, etc. These new facilities and infrastructure could reduce available habitat and create localized damage to vegetation, soil compaction and erosion, while increasing the chance of wildlife disturbance and disturbance to other visitors. These potential negative effects would be minimized through careful planning and management. Popular activities on site-specific areas could be controlled to reduce impacts through proper design, site selection and construction technique.

One feature of this alternative would include expanding the current Refuge headquarters building (per guidance contained in the 1979 Master Plan and public use plan), which would help accommodate large groups of visitors that have been drawn to the Refuge by the whooping crane and savanna restoration projects. It would not however provide for the larger-scale visitation and use changes (more people coming to the Refuge, and the trend in more people coming to see wildlife rather than harvest related reasons) that Refuge staff and stakeholders feel are necessary for accomplishing the Refuge's mission, as well as accommodating the desires of local towns, townships, and counties in making the Refuge a regional attraction for outdoor enthusiasts. The land area that would be used for the current headquarters expansion is not an area currently used by large numbers of refuge visitors (e.g., hunters, bird watchers, anglers). There are no federally-listed species or Region 3 conservation priority species located in the area. There are no sensitive habitats located in the area. There are no known cultural or archaeological resources located in the area. Thus, adverse impacts to current Refuge uses (such as hunting) and habitat and other resources would be minimal.

Relative to staffing patterns, the Refuge currently supports two part-time Park Ranger positions devoted to visitor services. In the past this has been insufficient to handle the number of requests for Refuge programs. With the popularity of the Refuge's savanna restoration and the whooping crane project growing each day, staff shortages will continue to get worse. Alternative 1 would provide no new staff for the visitor services program. Volunteers would be emphasized to help with the additional workload associated with the whooping crane project. If this effort fails, some staff and resources may need to be redirected from current activities.

3.2 Alternative 2

Refuge visitation has increased yearly since the development of the 1979 Master Plan. Again, the reasons that people come to the Refuge have also changed. Uses like wildlife observation and relaxation are surpassing hunting and fishing as the most common reasons for visitors to come to the Refuge and Refuge area. The Refuge also has additional attractions, such as examples of globally rare savannas, the federally listed Karner blue butterfly and, potentially, the whooping crane, one of the rarest birds in the world.

Under Alternative 2, the Refuge's visitor services program would remain roughly status quo. No additional emphasis would be placed on providing high quality wildlife-dependent public uses of the Refuge. Visitation would probably continue to increase due to recent Refuge developments (whopping crane project, savanna restoration). The Refuge would not attempt to either enlarge the existing Refuge headquarters building (per guidance contained in the Master Plan) or build a new visitor center (alternative 3). Without additional infrastructure, the quality of Refuge visits would probably decline.

Relative to staffing patterns, the Refuge currently supports two part-time Park Ranger positions devoted to visitor services. In the past this has been insufficient to handle the number of requests for Refuge programs. With the popularity of the Refuge's savanna restoration and the whooping crane project growing each day, staff shortages will continue to get worse. Like alternative 1, alternative 2 would provide no new staff for the visitor services program. Volunteers would be emphasized to help with the additional workload associated with the whooping crane project. If this effort fails, some staff and resources may need to be redirected from current activities.

3.3 Alternative 3

Under Alternative 3, the Refuge has outlined its goals for public education and recreation and specific objectives, strategies, and projects that would support the Refuge in meeting those goals (see attached CCP). The CCP incorporates visitor services with other Refuge work, such as Service trust resource management, into one cohesive management planning effort. While Alternative 2 would allow for updated step-down plans, it does not provide for strategic implementation of all Refuge programs to achieve the Refuge's purpose and vision.

Alternative 3 also recognizes substantial changes in visitor numbers and use patterns brought on by demographic shifts (more people are using refuges for wildlife viewing and relaxation, fewer users are hunting and fishing) and new initiatives and projects such as savanna restoration and the reintroduction of whooping cranes on the Refuge. These new initiatives and projects could reduce available habitat and create localized damage to vegetation, soil compaction and erosion, while increasing the chance of wildlife disturbance and disturbance to other visitors. However, these potential negative effects would be short-term and be minimized through careful planning and management. Popular activities on site specific areas could be controlled to reduce impacts through proper design, site selection and construction techniques.

One of the projects called for under this alternative is the construction of a new visitor center. The area proposed for locating the visitor center (Figure 3) is not an area currently used by large numbers of refuge visitors (e.g., hunters, bird watchers, anglers). There are no federally-listed species or Region 3 priority species located in the proposed area. There are no sensitive habitats located in the area. There are no known cultural or archaeological resources located in the area. Thus, adverse impacts to current Refuge uses (such as hunting) and habitat and other resources would be minimal.

There are several notable positive impacts associated with a new visitor center at the Refuge. Having a facility located on state highway 21 will increase the Refuge's profile in the local community, and for users of one of Wisconsin's most traveled east-west travel corridors. The current main office is three miles north of state highway 21. The new visitor center would have greater accessibility than the current Refuge main office. The new visitor center would also allow the Refuge to be more effective at transmitting Service messages to a broader group of stakeholders, through high quality education and interpretation programs.

Several factors have been considered to minimize the impact of the facility and parking area on the environment. The visitor center would be constructed to blend in with the surrounding landscape (low profile and natural siding materials). Sewage treatment and heating and cooling systems have been chosen to minimize environmental impacts. Parking lot lights would be light-sensing to save electricity. Native vegetation would be used for all landscaping to provide habitat

for Service trust species, minimize runoff from the parking area, and to serve as an interpretive tool for visitors. Finally, recreational and interpretive opportunities near state highway 21 would give the Service the largest increase in public exposure with the least impact on Service trust resources by concentrating the increased visitation on the periphery of the Refuge. The Refuge would work with the Wisconsin Department of Transportation to provide for a safe entrance and exit from state highway 21 to the visitor center.

Relative to staffing patterns, the Refuge currently supports two part-time Park Ranger positions devoted to visitor services. In the past this has been insufficient to handle the number of requests for Refuge programs. With the popularity of the Refuge's savanna restoration and the whooping crane project growing each day, staff shortages will continue to get worse. Alternative 3 calls for three full-time Park Rangers, one whose position would be dedicated solely to law enforcement. These positions, along with increased funding and the help of Refuge volunteers, would be adequate to meet the Refuge's visitor service responsibilities. The Refuge anticipates increased funding as a result of the whooping crane project, and has already requested additional funding for staff and equipment. If these efforts fail, some staff and resources may need to be redirected from current activities.

4. IMPACTS ASSOCIATED WITH HABITAT MANAGEMENT

4.1 Alternative 1 (No Action)

Table 13 details the types and amounts of habitats the Refuge would manage by 2015 under Alternative 1, based on guidance contained in the 1979 Master Plan and subsequent step-down plans. No additional habitat management would occur in the Yellow River Focus Area aside from some private lands activities associated with the Refuge's Partners for Wildlife private lands program.

TABLE 13
Habitat Types on the Refuge by 2015

Land Cover Type	Acres	Compared to 2000
Open Landscapes (grasslands, savanna, shrublands, old fields)	6,300 acres	+ 2,600 acres (savanna)
Coniferous Forests	550 acres	- 350 acres
Mixed Deciduous and Coniferous Forests	8,000 acres	- 2,000 acres
Broad-leaf Deciduous Forests	5,350 acres	- 250 acres
Emergent Wetlands and Wet Meadows	10,500 acres	Status Quo
Forested Wetlands	5,700 acres	Status Quo
Lowland Shrubs	5,500 acres	Status Quo
Open Water Areas	1,800 acres	Status Quo

General Considerations

No forest land considered "old growth" would be adversely impacted by the Refuge's open landscape restoration efforts. No "critical habitat" would be adversely impacted by this alternative. This alternative would not lead to increased runoff or erosion, nor would it contribute to increased sedimentation in Refuge pools or waterways. Existing forest habitats would not be unduly fragmented by timber harvest activities.

The use of prescribed fire as a habitat management tool would be governed by the guidelines and provisions contained in Ch. 2 "Elements Common to all Alternatives". Impacts associated with the use of fire as a management tool on the Refuge are common to all alternatives and are discussed in the "General Impact Analysis" section found above and the Refuges Fire Management Plan.

Specific impacts to Service trust resources (including native biological diversity), visitor services, and the Yellow River Focus Area due to habitat management activities associated with alternative 1 are discussed in those sections.

4.2 Alternative 2

Under Alternative 2, through guidance contained in the 1979 Master Plan, the Refuge would manage the habitat types and amounts described in Table 14 by 2015. The Refuge's savanna restoration program, which began in the early 1990s, would be discontinued. Habitats would be maintained in proportion to what is there presently. Timber harvest as a tool in habitat restoration and establishment (savanna and grasslands) would cease. The Service would not pursue additional habitat management in the Yellow River Focus Area.

TABLE 14
Habitat Types on the Refuge by 2015

Land Cover Type	2015 Acres	Compared to 2000
Open Landscapes (grasslands, savanna, shrublands, old fields)	3,700 acres	Status Quo
Coniferous Forests	900 acres	Status Quo
Mixed Deciduous and Coniferous Forests	10,000 acres	Status Quo
Broad-leaf Deciduous Forests	5,600 acres	Status Quo
Emergent Wetlands and Wet Meadows	10,500 acres	Status Quo
Forested Wetlands	5,700 acres	Status Quo
Lowland Shrubs	5,500 acres	Status Quo
Open Water Areas	1,800 acres	Status Quo

General Considerations

No forest land considered "old growth" would be adversely impacted by the Refuge's open landscape restoration efforts. No "critical habitat" would be adversely impacted by this alternative. This alternative would not lead to increased runoff or erosion, nor would it contribute to increased sedimentation in Refuge pools or waterways. Existing forest habitats would not be unduly fragmented by timber harvest activities.

The use of prescribed fire as a habitat management tool would be governed by the guidelines and provisions contained in Ch. 2 "Elements Common to all Alternatives". Impacts associated with the use of fire as a management tool on the Refuge are common to all alternatives and are discussed in the "General Impact Analysis" section found above.
Specific impacts to Service trust resources (including native biological diversity), visitor services, and the Yellow River Focus Area due to habitat management activities for alternative 2 are discussed in those sections.

4.3 Alternative 3 (Preferred Alternative)

Table 15 describes the types and amounts of habitats the Refuge would manage under Alternative 3 by 2015, based on guidance contained in the Refuge CCP.

TABLE 15
Habitat Types on the Refuge by 2015

Land Cover Type	Acres	Compared to 2000
Open Landscapes (grasslands and savannas)	9,800 acres	+ 2,600 acres savanna + 3,500 acres grassland
Coniferous Forests	550 acres	- 350 acres
Mixed Deciduous and Coniferous Forests	4,500 acres	- 5,500 acres
Broad-leaf Deciduous Forests	5,350 acres	- 250 acres
Emergent Wetlands and Wet Meadows	12,500 acres	+ 2,000 acres
Forested Wetlands	5,700 acres	Status Quo
Lowland Shrubs	3,500 acres	- 2,000 acres
Open Water Areas	1,800 acres	Status Quo

General Considerations

No forest land considered "old growth" would be adversely impacted by the Refuges open landscape restoration efforts. No "critical habitat" would be adversely impacted by this alternative. This alternative would not lead to increased runoff or erosion, nor would it contribute to increased sedimentation in Refuge pools or waterways. Existing forest habitats would not be unduly fragmented by timber harvest activities.

The use of prescribed fire as a habitat management tool would be governed by the guidelines and provisions contained in Ch. 2 "Elements Common to all Alternatives". Impacts associated with the use of fire as a management tool on the Refuge are common to all alternatives and are discussed in the "General Impact Analysis" section found above and the Refuges Fire Management Plan.

Specific impacts to Service trust resources (including native biological diversity), visitor services, and the Yellow River Focus Area due to habitat management activities for alternative 3 are discussed in those sections.

5. IMPACTS ASSOCIATED WITH THE YELLOW RIVER FOCUS AREA

5.1 Alternative 1 (No Action)

Under Alternative 1, the Refuge would only intensify and concentrate its private lands program in the Yellow River Focus Area. The Service would not seek to acquire any realty interests by fee-title or conservation easements in land and water in the Yellow River Focus Area. The Service would continue to develop Wildlife Management Agreements with landowners in the area.

As of September 2000, of the 230 landowners in the Yellow River Focus Area, 121 had signed up with the Service for technical assistance. Of those, 16 landowners owning 1,233 acres have signed Wildlife Management Agreements. Restoration work accomplished to date includes: three sedge meadow restorations (62 acres), three wetland restorations (33 acres), one bottomland hardwood restoration (54 acres) and six savanna/prairie restorations (135 acres). All work was performed by landowners and Refuge Private Lands personnel. These efforts, however, offer very little long-term protection of habitats, as most are short-term in nature.

Habitat Considerations

Under this alternative, we would expect small increases in wetland and upland habitats to be restored in the Yellow River Focus Area through existing USDA, county, and the Service's Partners for Wildlife private lands program. Currently these programs offer restoration to small tracts of habitat scattered throughout large geographic areas (as opposed to larger single blocks). Similar increases in habitat could be realized through the Refuge's Partner for Wildlife program.

However, many of the existing wetland and upland habitats in the area could be impacted by the lack of a central management plan for the area, which may lead to increased residential development in undesirable locations or proportions, unmonitored water quality changes, declines in quality recreational and aesthetic experiences, and declines in the overall value of the Yellow River to local communities. Waterfowl, sandhill crane, other waterbirds, songbirds, fish, and many resident wildlife species would likely decrease over time as habitat degradation occurred. Unique plant communities could be degraded or lost due to conversion of additional wetlands to agricultural lands, namely cranberry production. Archeological resources would be offered little protection and subject to loss. Public use opportunities would be limited to private landowners, others with permission from landowners, and the general public on the public lands in the area.

Many areas of bottomland forest not considered wetlands under the Swampbuster provisions of the Food Security Act could eventually be cleared and put into other uses not beneficial to wildlife. The many water quality and wildlife habitat benefits associated with these areas would be lost. Although many current landowners in the area demonstrate a laudable conservation ethic, lack of a Service presence could result in timber harvest decisions on un-managed woodlands that are based primarily on maximizing short-term income. Continued high-grading of timber could further reduce tree species diversity, and the heavy mast component (oaks) of the forest community could be reduced, thus reducing food for waterfowl. Emergent, scrub-shrub and open water wetlands would continue to receive limited protection afforded by present regulatory processes.

Land Acquisition and Property Taxes

Under Alternative 1 the Refuge would only intensify and concentrate its private lands program in the Yellow River Focus Area. The Service would not acquire any realty interests (e.g., fee-title or conservation easements) in land and water in the Yellow River Focus Area. No land would be removed from the tax rolls. No Refuge Revenue Sharing Payments would be made to the affected townships, since no additional land would be removed from the tax rolls.

5.2 Alternative 2

Alternative 2 would not provide staff and funding to provide a leadership role in facilitating pro-active conservation approaches in the area. This would mean the Service would not intensify and concentrate its private lands efforts in the area or seek to acquire realty interests in lands and waters. All efforts aimed at developing Wildlife Management Agreements with landowners in the Yellow River Focus Area would cease. Efforts at preserving the habitat work accomplished to-date through the Refuge's Partners for Wildlife program would br forgone.

Habitat Considerations

Like alternative 1, small increases in wetland and upland habitats would be restored in the Yellow River Focus Area through existing USDA and county programs. Again, most of these programs restore small tracts of habitat scattered throughout large geographic areas (as opposed to larger single blocks). While important habitat for migratory birds and other diverse wildlife would be restored, there is no provision for the protection of a large, regionally important landscape such as the Yellow River Focus Area.

Again, many of the existing wetland and upland habitats in the area could be impacted by the lack of a central management plan for the area, which may lead to increased residential development in undesirable locations or proportions, unmonitored water quality changes, declines in quality recreational and aesthetic experiences, and declines in the overall value of the Yellow River to local communities. Waterfowl, sandhill crane, other waterbirds, songbirds, fish, and many resident wildlife species would likely decrease over time as habitat degradation occurred. Unique plant communities could be degraded or lost due to conversion of additional wetlands to agricultural lands, namely cranberry production. Archeological resources would be offered little

protection and subject to loss. Public use opportunities would be limited to private landowners, others with permission from landowners, and the general public on the public lands in the area.

Like alternative 1, many areas of bottomland forest not considered wetlands under the Swampbuster provisions of the Food Security Act could eventually be cleared and put into other uses not beneficial to wildlife. The many water quality and wildlife habitat benefits associated with these areas would be lost. Timber harvest decisions on un-managed woodlands could likely be based primarily on maximizing short-term income (again, given current landowners' conservation ethic, this is possible but not necessarily certain). Continued high-grading of timber could further reduce tree species diversity, and the heavy mast component (oaks) of the forest community could be reduced, thus reducing food for waterfowl. Emergent, scrub-shrub and open water wetlands would continue to receive limited protection afforded by present regulatory processes.

Land Acquisition and Property Taxes

Under alternative 2, the Service would not seek to acquire any realty interests (fee-title or conservation easements) in land and water in the Yellow River Focus Area. No land would be removed from the tax rolls. Therefore, no Refuge Revenue Sharing Payments would be made to the effected townships.

5.3 Alternative 3

Implementation of the CPP would provide the Refuge with additional tools to restore and preserve the Yellow River Focus Area in a way that supports Service trust resources and the diverse group of stakeholders owning land in the area (willing sellers only). The Refuge would continue to employ a private lands biologist devoted to working in the Yellow River Focus Area. A staff person dedicated to the Yellow River Focus Area conservation effort would provide the attention and continuity necessary to maintain stakeholder trust and allow for wetland and prairie restorations to continue in other areas of the 12-county Private Lands District.

Habitat Considerations

Like alternative 1 and 2, small increases in wetland and upland habitats would be restored in the Yellow River Focus Area through existing USDA and county programs. Again, most of these programs restore small tracts of habitat scattered throughout large geographic areas (as opposed to larger single blocks). Under alternative 3, like alternative 1, Refuge private lands staff will continue providing landowners technical and funding assistance to manage fish, wildlife, and plants on their land and seek to augment other non-Service conservation efforts.

As of September 2000, of the 230 landowners in the Yellow River Focus Area, 121 had signed up with the Service for technical assistance. Of those, 16 landowners owning 1,233 acres have signed Wildlife Management Agreements. Restoration work accomplished to date includes: three sedge meadow restorations (62 acres), three wetland restorations (33 acres), one bottomland hardwood restoration (54 acres) and six savanna/prairie restorations (135 acres). All work was performed by landowners and Refuge Private Lands personnel. Refuge private lands staff will

continue providing landowners technical and funding assistance to manage fish, wildlife, and plants on their land, and seek to augment these other non-Service conservation efforts. In addition, under this alternative the Service would seek to protect these and other areas by offering to purchase a realty interest in properties with high natural resource values (willing seller only).

Land Acquisition and Property Taxes

Alternative 3 would expand the Refuges private lands conservation effort by offering conservation easements and fee title purchases to willing landowners, further preserving the restoration work done through the Refuge's Wildlife Management Agreements and other non-Service programs. While the Yellow River Focus Area program emphasizes conservation of high quality wildlife habitat in private ownership, land acquisition by the Service could involve approximately 3,750 acres (250 acres/year) over the next 15 years (based on a future funding scenario and the presence of willing sellers). In reality, this figure could be more or less given the uncertainty of future funding scenarios and the presence of willing participants. All lands acquired by the Service would be administered and managed by the National Wildlife Refuge System, Necedah National Wildlife Refuge. Tracts in which less than fee-title agreements are negotiated would remain in private ownership. All restoration and preservation would be carried out on a tract-by-tract basis as participants and fiscal resources become available over a 15-year time period. Funding for land acquisition would be from the Migratory Bird Conservation Fund (proceeds from the sale of Federal duck stamps) using the authority of the Migratory Bird Conservation Act and the Land and Water Conservation Fund using the authority of the Fish and Wildlife Act of 1956. Participation with the Service in any aspect of the Yellow River Focus Area is voluntary, and all land acquisition would be from willing sellers only.

The Refuge Revenue Sharing Act of June 15, 1935, as amended, provides for annual payments to counties or the lowest unit of government that collects and distributes taxes based on acreage and value of National Wildlife Refuge lands located within the county. The monies for these payments come from two sources: (1) net receipts from the sale of products from National Wildlife Refuge System lands (oil and gas leases, timber sales, grazing fees, etc.) and (2) annual Congressional appropriations. Annual Congressional appropriations, as authorized by a 1978 amendment, were intended to make up the difference between the net receipts from the Refuge Revenue Sharing Fund and the total amount due to local units of government.

Payments to the counties are calculated based on whichever of the following formulas as set out in the Act provides the largest return: (1) $.75 per acre; (2) 25 percent of the net receipts collected from refuge lands in the county; or (3) three-quarters of 1 percent of the appraised value. In the state of Wisconsin, three-quarters of 1 percent of the appraised value always brings the greatest return to the taxing bodies. Using this method, lands are re-appraised every 5 years to reflect current market values.

According to the Refuge Revenue Sharing Act, which authorizes the Service to make these payments, "Each county which receives payments....shall distribute, under guidelines established by the Secretary, such payments on a proportional basis to those units of local government (including, but not limited to, school districts and the county itself in appropriate cases) which have

incurred the loss or reduction in real property tax revenues by reason of existence of such area." In essence, the Act directs the counties or lowest unit of government that collects and distributes taxes to distribute refuge revenue sharing payments in the same proportion as it would for tax monies received.

Evaluating the environmental consequences for Alternative 3 is complicated by the Service's willing-seller-only acquisition policy. Because the Service would be buying land from willing sellers only (easements and fee-tile acquisitions), and nearly all of the land in the Yellow River Focus Area is in private ownership, there is no reliable way to predict when or where particular land parcels might be restored or preserved. Based on this uncertainty, it is problematical at best to identify specific time schedules with locations for implementation of Refuge management programs and land use changes.

However, in the spring of 2001 Refuge staff and regional office personnel held a public meeting at the Town of Necedah town hall to discuss the Yellow River Focus Area project. The following analysis of potential tax implications to the Town of Necedah was prepared for that meeting.

Town of Necedah

Total Assessments	$82,170,792
Tax Rate	$23.50 per $1,000 assessed value
Total Revenue Received	$1,931,013

The assessment makes the following three assumptions:

1. The U.S. Fish and Wildlife Service acquires 250 acres of land in fee-title in the Town of Necedah.
2. The value of the land is $1,000 per acre (estimated).
3. The total valuation of the land is $250,000 (250 acres X $1,000 per acre).

Based on the above assumptions, the total amount of lost property tax revenue as a result of the Service's hypothetical purchase of 250 acres would equal $5,875 per year ($250,000 / $1,000 X $23.50)

After the land was acquired, the Service would make a refuge revenue sharing payment to the Town of Necedah. The Service's refuge revenue sharing payment (at 100 percent) would be $1,875 per year ($250,000 X .0075).

The Service's refuge revenue sharing payment to the Town of Necedah at 53 percent of entitlement would be $993.75 per year.

The difference between the taxes on the 250 acres used in this example (had they remained in private ownership) and the Service's refuge revenue sharing payment would be $5,875 (taxes) - $993 (revenue sharing payment) = $4,882 per year.

The amount of revenue lost as a percentage of total revenue received by the Town of Necedah ($4,882/$1,931,013) would equal .25 percent (1/4 of 1 percent).

Since roughly 60 percent of the tax revenue received by the Town goes to the school district, and the state makes up any shortfall in school funding due to public land ownership, the actual loss would be $1,952 (.4 X $4,882)(the state would pay the other $2,929 to the school district).

The amount of tax revenue lost after the state payment to the school district (expressed as a fraction of total tax revenues) would be .10 or 1/10 of 1 percent ($1,952/$1,931,013).

Lastly, for comparison purposes and using the above analysis, if someone is currently paying roughly $1,000 in property taxes for living in the Town of Necedah, they could expect their taxes to increase by roughly $1.00 the following year as a result of Service fee-title acquisition of land in the Yellow River Focus Area (250 acres valued at $1,000 per acre).

6. SUMMARY OF ENVIRONMENTAL IMPACTS

TABLE 16
Summary of Environmental Impacts

ISSUE	ALTERNATIVE 1 (Guidance contained in the 1979 Master Plan and associated Step-down Management Plans)	ALTERNATIVE 2 (Guidance contained in the 1979 Master Plan)	ALTERNATIVE 3 (Guidance contained in the Refuge CCP)
1. Service Trust Resources			
- Listed Species	Populations of listed species on the Refuge would likely remain the same or increase slightly. Eastern massasauga rattlesnakes in the Yellow River Focus Area (YRFA) may decline as development encroaches the area.	Populations of listed species on the Refuge would likely remain the same or increase slightly. Eastern massasauga rattlesnakes in the YRFA may decline as development encroaches the area.	Populations of all listed species on the Refuge and in the YRFA would likely increase. This alternative would have the greatest contribution to listed species.
- Waterfowl and other Mig. Birds	Would not increase waterfowl use and production. Would not increase grassland species of concern. Would increase savanna species of concern through additional savanna management.	Would not increase waterfowl use and production. Would not increase grassland species of concern. Would not increase savanna species of concern through additional savanna management. Local populations in the YRFA would likely decline.	Would increase waterfowl use and production at the Refuge through additional habitat management. Would increase grassland species of concern through additional grassland management. Would increase savanna species of concern through additional savanna management.

TABLE 16 Summary of Environmental Impacts			
- Biological Diversity	Would increase native biological diversity on Refuge land through savanna restoration efforts and in the YRFA through the Refuge's Private Lands Program .	Would not increase native biological diversity on either Refuge land or land within the Yellow River Focus Area.	Would increase native biological diversity on both Refuge land and land within the YRFA.
2. Visitor Services	The quality of Refuge visits would likely decline as visitation increases due to recent developments (whooping crane introduction).	The quality of Refuge visits would decline as visitation increases due to recent developments (whooping crane introduction).	Many upgrades to existing facilities would occur. The quality of Refuge visits would improve most.
3. Habitat Management - Fire Management	Would restore native savanna and contribute to the recovery of early successional forests. Would be safely done	Could lead to further degradation of forest land (over mature closed-canopy forests). Would be safely done.	Would restore native savanna and contribute to the recovery of early successional forests. Would establish native prairies and contribute to the recovery of those ecosystems as well. Would be safely done.
4. Yellow River Focus Area	No impact to private property rights. No impact to taxes. Could lead to further degradation of the resources.	No impact to private property rights. No impact to taxes. Most likely would lead to further degradation of the resources.	No impact to private property rights. Could result in reduced tax revenues as land is purchased in fee-title. Would protect existing and restorable resources in the area.